

Technical Requirement for Frozen Fish Sorting Conveyor and attached Freezing Crate Tipper

The Frozen Fish Sorting Conveyor and Freezing Crate Tipper are separate devices but operate as a single unit. For the purposes of clarity, both are specified separately but in the same section:

Freezing Crate Tipper

General and Scope of Work

Fish which has been frozen within Freezing Crates will require sorting to size. The Freezing Crates will be unlatched and removed from the Brine Freezing Tanks with the brine tank crane, and will be placed on the Freezing Crate Unloader. The Unloader will slowly upturn the Freezing Crate so the frozen tuna slides out of the crate and down the chute onto the Sorting Conveyor. When the container has been emptied, the

Unloader will return the Freezing Crate to the upright position for removal by the Brine Tank Cranes back to the Brine Tanks.

The major requirements for the Freezing Crate Unloader are:-

- a. It shall be capable of accepting and inverting a fully loaded Freezing Crate to an angle of not more than 20° from the vertical, inverted.
- b. It shall be capable of continuous and sustained operation with a 2.0 Tonne test load placed evenly inside a Freezing Container.
- c. It shall be provided with an operating platform, and associated stairway fully guarded with kickplates, handrails and protection from moving parts of the tipper. The platform shall be located so that the operator can have a clear view of the unloading conveyor while operating the raise/lower controls. Also, it shall be located so the operator can easily clear any blockages, and close the freezing container lids after unloading.
- d. The controls shall include an on-off switch and progressive raise- lower controls which at maximum speed will fully invert a crate in no more than 30 seconds, the same time for returning the container to the lowered position. The ratio between maximum and minimum continuous operating cycle times shall be at most 1:6, preferably 1:10. The control lever will be of the spring loaded hydraulic type with the hands off position holding the crate in a fixed position. The raise and lower movements shall be clearly labelled.
- e. Actuation shall be by hydraulics using either linkages or gearing. Full protection shall be provided to prevent overloading, if the raise- lower lever is operated when the Tipper is at the limits of its movement. The hydraulic unit will be provided with reservoir oil level indication, full flow filtration pressure gauges and safety valves. Proprietary hydraulics units are preferred.
- f. The Tipper structure shall be of robust construction designed to minimise deflection and vibration.
- g. The discharge chute shall form part of the Tipper and shall be constructed of at least 3 mm type 316 stainless steel, sufficiently braced to prevent permanent distortion during normal operation. If necessary, a heavy rubber flap shall be fitted above the chute to prevent overflow of tuna onto the sorting conveyor.
- h. It is noted that the Tipper and ancillaries are located in one of the most corrosion prone areas in the entire plant. All parts of the structure made of a corrodible material shall be fully hot dip

galvanised, and painted according to the appropriate finish Surface Treatment Standard Technical Specification. All parts not suited to this method of protection shall be fully protected by a method subject to the approval of the Employer. Base plates of all equipment shall be at least 50 mm clear of the floor and fully grouted using a high strength non shrink epoxy grout. All anchor bolts and embedments shall be of T316 stainless steel; galvanising is not acceptable.

- i. All components shall be arranged to be easily accessible for maintenance.
- j. The Tipper shall be positioned so that it is aligned with the sorting conveyor and can be loaded with freezing containers by both brine tank cranes (i.e.; the eastern most crane must be capable of serving the unloader when the western most crane is at the limits of its travel).
- k. The entire Tipper system shall be suited for washing down with sea water.

The scope of work for this Section is the supply, installation and commissioning of one Freezing Crate Tipper and ancillaries as described above.

i. Technical Summary

Item	Freezing Crate Tipper
Number Required	One (1)
Capacity	2.0 Tonne
Ancillaries	- Discharge Chute - Operator Platform - Hydraulic Power Unit
Construction	Heavy duty throughout. Fully protected against extreme corrosion.

Frozen Fish Sorting Conveyor

General and Scope of Work

Tuna discharged from the freezing crate tipper will be deposited on to the sorting conveyor where they will be sorted off by hand into at least four (4) sorting stations. Each of the sorting stations will consist of a platform and steps, the height of the platform being 900 mm below the top of the conveyor belt. On both sides of each sorting station will be a cold store crate. Two crates per sorting station will be required so sorting can continue when one crate has been filled, and is removed by an electric forklift and taken to the cold store. The sorting personnel will use rakes to slide the tuna across the conveyor belt and into a cold storage crate. No hand lifting of tuna is permitted so the conveyor belt top must be higher than the cold storage crates and the conveyor edge guards shall be low and smoothly shaped to provide negligible resistance to the passage of the tuna, while offering maximum operator protection from moving conveyor parts.

When dealing with certain catches it may be advantageous to place the operator platforms on the opposite sides of the conveyor to the cold storage crates, and use the rakes to push the tuna into the crates. For this reason, provision shall be made to relocate the platforms as described with a minimum of effort.

The major requirements of the sorting conveyor and ancillaries are:-

- a. The conveyor shall be of robust construction capable of withstanding all continuous and impact loads associated with the tipper and boring operations. Impact absorbing rollers will be installed for at least the first 2.0 metres after the tipper discharge chute.
- b. The conveyor shall be of the belt type with a belt width at least 1,200 mm of the width of the freezing crate discharge chute - whichever is greater.

Conveyor belting shall be at least of 2 ply construction, polyester reinforcing with scaled edges. The belting shall be suitable for use with food products within the temperature range of -16°C to +40°C.

Approval for use with foodstuffs by FDA or other specifically approved authority is a minimum requirement for the belting. The belting shall be completely impervious to sea water, brine and fish oils and shall have at least a 3 mm cushioning top cover. Belt joining may be by stainless steel alligator lacing or by vulcanizing. The conveyor shall be designed and belt shall be installed and operated in accordance with the belt manufacturers recommendations, with the proviso that the true belt tension shall not exceed 66% of the manufacturers maximum recommended operating tension for continuous use.

- c. The conveyor frame shall be of robust construction, of hot dip galvanised and painted steel or bare stainless steel. Safety guards shall be fitted to the sides of the conveyor to prevent accidental contact by the operator with any moving parts, other than the belt. The guards shall be of T316 stainless steel (2.0 mm minimum thickness), arranged for easy removal and replacement for cleaning purposes, without the use of tools.

Conveyor idlers shall be spaced to limit the maximum belt deflection under normal operation to no more than 80% of the manufacturers recommended deflection extension. The use of plastic bearings is permitted.

The head and tail pulleys shall be of fully corrosion resistant materials, crowned to produce a tracking accuracy of ± 10 mm. Training idlers shall be installed if required, to maintain track within these limits. Edge roller idlers are not permitted. Drift switches shall be fitted at both sides and ends of the conveyor which will stop the drive motor if the belt, drift exceeds the permitted limits. The driver roller drum shall be surface finished so belt slippage is restricted to within the belt manufacturers recommendations.

Shaft materials will be stainless steel throughout. The conveyor drive will be mechanical variable speed unit, capable of providing a manually adjustable speed range of between 0 and 30 metres per minute. The drive and transmission will be located in a hoseproof stainless steel enclosure with the speed adjustment control in an easily accessible position. The enclosure will provide minimum impediment to overhaul and servicing of the drive equipment.

Belt tensioning shall be manually adjustable at the tail end. Sufficient adjustment shall be available to entirely slacken the belt for easy replacement, and to fully tension the belt in the fully stretched (when worn) condition. Both sides shall be independently adjustable in order to adjust the belt framing.

The conveyor support frame shall be of robust construction, fully braced and capable of withstanding all forces expected during normal operation without damage.

- A PVC coated stainless steel trip wire shall extend down the entire length of both sides

of the conveyor. Each trip wire shall be connected to a switch which stops the conveyor drive when the wire is pulled. The activating force applied as the wire shall be between 50 and 100N, transverse to the wire. Care shall be exercised in the wire locations as they shall be easy to locate in an emergency but not be capable of accidental tripping during normal operation. After a trip, the conveyor shall only be capable of restart from the control panel which shall be located on the tipper platform immediately adjacent to the tipper controls.

The conveyor controls shall have at least three separate and clearly labelled push buttons for start, stop and reset after tripping from trip wire activation, excessive belt drift, or motor overload.

- The length of the conveyor shall be sufficient to permit four sorting stations to operate as described above with generous clearances for forklift operation. The height of to the top of the conveyor belt shall be at least 50 mm greater than the height of a cold store crate.
- Four sorting platforms are included in the scope of supply. They shall have a working area 1,000 mm square and be complete with steps to AS1657 or approved equivalent. The height of the platform shall be 900 mm below the top of the conveyor.
- Six sorting rakes are included in the scope of supply. They shall be of stainless steel construction with foam rubber insulating handles, handle length 1.5 m x 32 mm minimum diameter and rake width 300 mm. They shall be of light weight construction but sufficiently strong to withstand normal operating loads without damage. All corners shall be radiused to prevent belt damage.

The scope of work for this Section is the supply, installation and commissioning of one (1) sorting conveyor complete with all ancillaries, as described above.

- It is noted that the conveyor and ancillaries are located in one of the most corrosion prone areas in the entire plant. All parts of the structure made of a corrodible material shall be fully hot dip galvanised, and painted to System G1 in Section 4.8 using an etch primer. All parts not suited to this method of protection shall be fully protected by a method subject to the approval of the Employer's Representative.

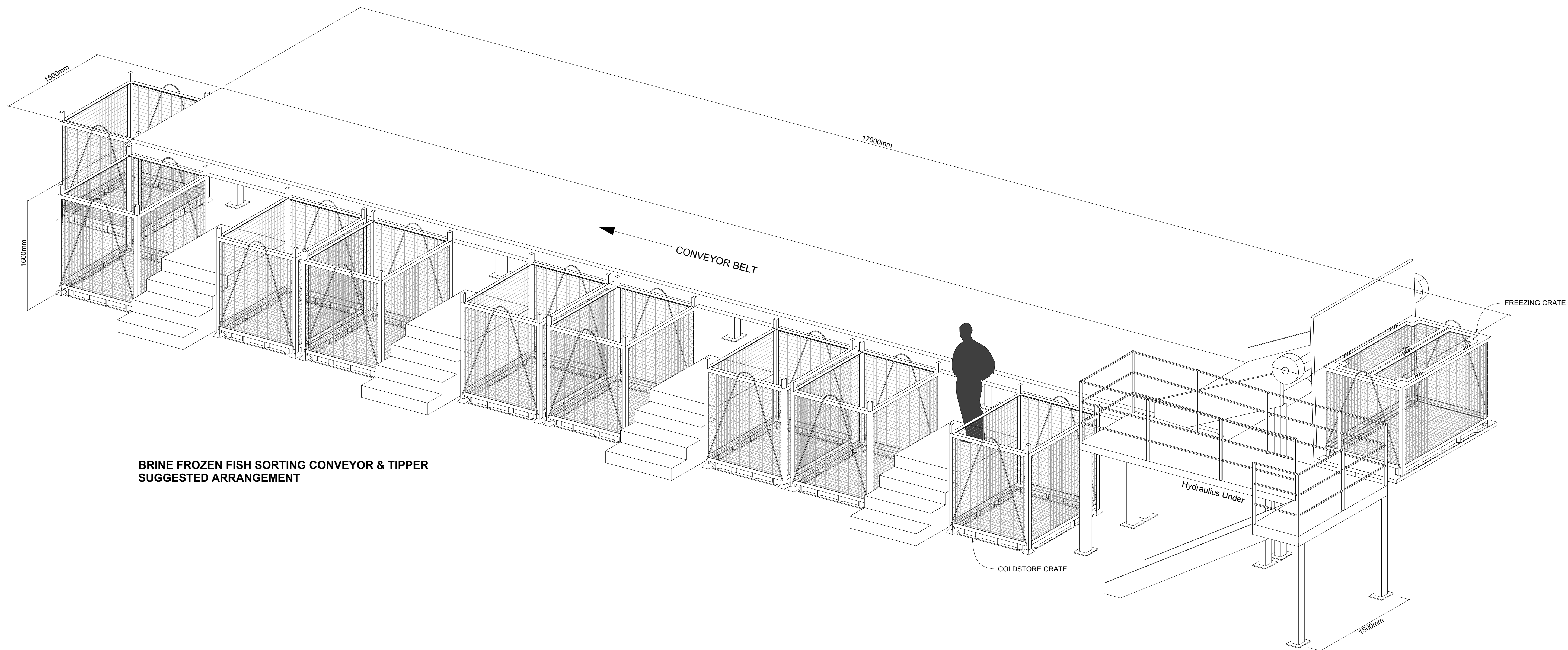
Base plates of all equipment shall be at least 50 mm clear of the floor and fully grouted using a high strength non shrink epoxy grout. All anchor bolts and embedments shall be of T316 stainless steel; galvanising is not acceptable. The sorting platforms shall not be bolted to the floor as they are relocatable.

- Components shall be arranged to be easily accessible for maintenance.
- The sorting conveyor shall be positioned so that it is aligned with the freezing crate tipper.
- The sorting conveyor shall be suited for washing down with sea water.

The scope of work for this Section is the supply, installation and commissioning of one sorting conveyor and ancillaries as described above.

Summary Specification

Item	Sorting Conveyor
Number Required	One (1)
Belt Width	1,200 mm
Conveyor Length	16.0 m nominal
Conveyor Height	1,750 mm
Belt Speed	Adjustable 0-30 metres/min
Ancillaries	Four (4) sorting platforms, six (6) rakes
Construction	Heavy duty throughout. Fully protected against extreme corrosion



**BRINE FROZEN FISH SORTING CONVEYOR & TIPPER
SUGGESTED ARRANGEMENT**